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Abstract

In this article, we reflect on architecture and management and organization theory, in terms of their mutual implications. We focus especially on a tacit implication in mainstream organization theory, which has an architectural genesis. In the past, management has been largely undergirded by a Cartesian rationality, one seen most clearly in the argument that structure follows strategy. Architecturally, this Cartesianism is present in the injunction that form follows function. Criticizing this point of view, we argue that organizations should be thought of as material, spatial ensembles — not just cognitive abstractions writ large. Linking space and organization in this way, we reflect on the power that every spatial organization necessarily implies, both in negative and positive terms. After examining existing approaches to this issue, we discuss some positive power implications for management. We introduce the concept of the generative building that, instead of being a merely passive container for actions happening in it, contributes positively towards an organization's capacities. We conclude with a reflection on the impact of the generative building on management and processes of organizing.

Keywords: space, organization, architecture, power, generative buildings

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'We are at a moment, I believe, when our experience of the world is less that of a long life developing through time than that of a network that connects points and intersects with its own skein ... In any case I believe that the anxiety of our era has to do fundamentally with space, no doubt a great deal more than with time.' Foucault (1998: 23, 26)

'In fact, space management may well be the most ignored — and most powerful — tool for inducing culture change, speeding up innovation projects, and enhancing the learning process in far-flung organizations. While we fret ceaselessly about facilities issues such as office square footage allotted to various ranks, we all but ignore the key strategic issue — the parameters of intermingling.' Peters (1992: 413)

'Meaning is produced from closure. The problem is how to open up gaps, create the clearings, break into the fissures and make the spaces.' Munro (2001b: 124)

Space may be thought of as an absence of presence, as a vast emptiness, as something that one can get lost in. Alternatively, it may be thought of socially, in terms of the ways that we and past and present others have filled it with meanings and presences, or denuded or denied it through determinate absences (Althusser 1971), which future generations might inherit. Its

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materiality has social meanings. For instance, a room may have a view, four walls, and a ceiling and floor, but that tells us nothing about it unless we know what meanings it contains, represses, opens up, or resonates with (Forster 1947). Space is both the medium and outcome of the actions it recursively organizes: what space is experienced as being limits and enables the possibilities of further social construction within it (Rosen et al. 1990).

A close look at a classic of management theory powerfully demonstrates the importance of space: within scientific management what did Taylor do other than reorganize the spatial arrangement of the entire organization by dividing space into individual cells, so that every single activity had to take place within its own space (cell), separated from the others? Guillén's (1997) recreation of Taylorism's 'lost aesthetic' captures scientific management as a cultural effect with spatial implications. Henry Ford also sought to redesign the use of space, inspired by the Chicago slaughterhouses. Both Taylor and Ford sought to impose a new design of power on the body and the spaces bodies occupied. In those early days, companies spent large sums on socially organizing their space — the moving production line of Ford was a significant investment in plant layout and design that many rivals could not afford to emulate, while the Taylor system also represented a significant investment in spatial redesign, tooling, and training.

In terms of more classical academic foundations, space has long been an implicit concern of organization theory. One thinks, for instance, of Weber's focus on the separation of private and public space (Weber 1978; Ferguson 1984) as a way of defining and limiting the power of the (masculine) office. Roethlisberger and Dickson's (1939) reflections on the consequences of changing variables in physical space created a new, unanticipated kind of social space: the Hawthorne experiments showed the tremendous (if unpredictable) impact of *social* (if not, as intended, *interior*) design on organizational behaviour. Goffman (1961) redefined the nature of organization around dramaturgically defined spaces, while Goldthorpe et al. (1968), by embedding the factory in a broader set of social spaces, sought to show how its life-world could not be sequestered behind an analytic cordon sanitaire. More recently, Gagliardi's (1990, 1996) focus on the aesthetics of space, opened up, if one will forgive the pun, the space that contributors such as Berg and Kreiner (1990), Rosen et al. (1990), Doxater (1990), Hatch (1990), Ciborra and Lanzara (1990), Sassoon (1990), and Witkin (1990) have made their own. Additionally, studies of workspaces (Becker 1982) and physical settings (Hatch 1997) have shown how office space influences human interaction and its symbolic functions (also see Hatch 1990), while other organization theorists have addressed specific aspects, such as 'ritual' space (Doxater 1990). Meanwhile, in general sociology Bauman's (1987) use of the metaphors of cultivation (of gardening and weeding) constituted different spaces in which various social practices could be conceptualized as either blooming or withering; additionally, he was concerned with the specific organizational space of 'camps' (Bauman 1989, 1995), which emerged from the South African Boer War to become a defining characteristic of the 20th century, as Bauman sees it.

Although the recognition that space is socially constructed is by now quite widespread, thus far, surprisingly, only a few major architectural metaphors have been used in organization theory: the differentiation between tents and palaces by Hedberg et al. (1976); Goffman's (1997) metaphor of front- and backstage; Mol and Law's (1994) conception of fluid space; Gagliardi's (1990) concept of aesthetic organizations; Hatch's (1997) reflection on the physical structure of organizations; Blau's (1984) enquiry into the social organization of architects as professionals; and Lash and Urry's (1994) economy of signs and spaces. However, despite these explicit works, with their multiple points of departure for the analysis of space, there remains in mainstream management and organization theory an implicit obligation to an architectural metaphor. Metaphors, as we well know, often have unacknowledged consequences for theorizing (Morgan 1986).

Architecture can be understood as a science, of which buildings are but the experiments writ large, of the spatial metaphors (plaza, fora, and tower) that constitute its discourse. Indeed, as most designs never get built, most experiments are writ small and remain imagined metaphors for unbuilt structures. Unlike a scientific paper that translates actions into words, architecture reflects on the translation of words into structures (Cooper and Law 1995). In organization theory, design produces representations of the organization: the M-form, the pyramid, the network, the cell, the virtual, and so on. It is these representations that are supposed to act and shape; in architecture, it is words that are translated into material structures. What happens when the two streams mingle, when architects reflect on how the structures they design shape organizational processes?

Architecture and Organization

The Space and Organization Workgroup (SPORG) at MIT's School of Architecture and Planning, created in 1990, is explicitly directed towards exploring the interdependence between physical space and organizational behaviour (Horgen et al. 1999). The main focus is on optimizing the use of space. Critically, this could be interpreted as conventional business process re-engineering with a spatial dimension added — indeed, almost a marriage between Taylor and Le Corbusier, which, as we shall see, is not so hard to effect. While this group relates architecture and organization, the members hardly engage with the complexity and power relations embedded in this interrelation — for this we must look elsewhere.

Markus and Cameron (2002) analysed the organization of Glasgow Homoeopathic Hospitals in 1999 in a seminal contribution that emphasized the importance of the spatial arrangements of organizations in relation to a strategic goal — in this case, to be an alternative hospital. The outline brief emphasized natural resources, self-caring patients, the therapeutic community, whole person care, holistic interpretation with orthodox care, understanding health and well-being, as well as issues of patient comfort. The building should embody, reflect, and trigger these values (Markus and Cameron 2002:

55). The different organization of the hospital required a different organization of space. Self-caring patients and the establishment of a therapeutical community required the 'access of patients to a knowledge base, both about their own case and what is generally known about their condition and treatment' (Markus and Cameron 2002: 58).

Markus and Cameron (2002) were aware that without challenging taken-for-granted divisions in and of space, attempting change of an organization's tasks, processes, and objectives seemed less likely to succeed. The successful enactment of the proposed homeopathic hospital strategy was regarded as a precondition for a fundamental reorganization of the spatial structure. Otherwise, the idealistically formulated vision in the brief would merely reflect the gap between 'ideas and actions' (Brunsson 1989), embodying the rational discourse as mere myth and ceremony (Meyer and Rowan 1977) and disguising mundane and mediocre realities.[1] In fact, the brief used language 'in a rhetorical and imaginatively innovatory way in the general discourse but was not seen as an instrument for change in the creation of categories and classification' (Markus and Cameron 2002: 58). These categories proved to be conventional, hierarchically grouped, and subdivided. The plan established six different categories (staff, patients, activities or processes, objects, administration, and kitchen) such that 'the radical, boundary-breaking aspirations of the general discourse were hardly reflected' (Markus and Cameron 2002: 57). It was an instance of organizational metaphors framing the conception of architectural space.

Markus and Cameron (2002) also researched the headquarters of Scandinavian Airlines System (SAS) built near Stockholm in 1987 to illuminate the limits of design seeking to realize rationally planned change (for a critique, see Czarniawska and Joerges 1995). The SAS Chief Executive Officer emphasized the importance and significance of the new building, saying 'Good ideas spring from impromptu meetings ... [the new building is designed to generate] good ideas [which are] rarely created when you're sitting at your desk alone and tense, but during creative encounters between human beings' (Markus and Cameron 2002: 59). In his vision, the new building would contribute to 'something of a cultural revolution', triggering openness, creativity, and teamwork, leading to a 'buzz of conversation between people who meet on their way to work' (Markus and Cameron 2002: 59). In planning the building, the whole environment was integrated into the plans seeking to enable 'growth as complete human beings — socially and privately and not only as workers' (Markus and Cameron 2002: 60). Here the CEO spoke a language of radical creativity, aware that a conservative taxonomy could hinder realization of challenging ideas and that the functional language of management could obstruct reorganization of the spatial structure.

A new discourse of office design has been established and captured by Joroff et al. (2001: 21), who argue in their manifesto for the 'agile workplace', that is, one which 'requires us to see ... work in new ways. Typically, work is seen in limited ways: by functional categories such as accounting or marketing ... These parameters are routine and static.' The new discourse of organization design sought to overcome routine and static parameters. How did this translate

into practice? In 1993, Grajewski investigated whether creative interaction, encounters, and teamwork were actually achieved by the new office design discourse (Markus and Cameron 2002: 60). Using Hillier's (1996) method he found that 64 percent of all interactions happened in individual offices, and not, as intended by the planners, in the multi-rooms, café shops, and meeting rooms. The findings suggest that both spaces with some enclosure and open-plan spaces 'could be either interactive or non-interactive; what determined the outcome was the spatial integration or segregation, within the block or the whole building, of the specific workplace itself, not its type — as labelled and designed' (Markus and Cameron 2002: 61) As Grajewski put it, 'The classification of a layout into one of these types does not necessarily describe either its spatial characteristics or its use patterns' (quoted in Markus and Cameron 2002: 61).

Allen (1977: 248) focused on 'interaction-promoting facilities'. In interaction-promoting rooms, such as washrooms, copying machines areas, cafeterias, laboratories, libraries, supply rooms, and conference rooms, unintended communication can happen. Architecturally, the general idea behind these designs is to create reasons for the movement of people between different subsystems and departments on the premise that the 'traffic pattern in any building certainly has a direct effect on communication' (Allen 1977: 248). One way to counter undesired physical separation is 'to locate a specific facility (such as a washroom or laboratory) in such a way that it is shared by two groups whose physical separation might otherwise inhibit communication' (Allen 1977: 249). The underlying idea is that contact and communication with (potential) discussion partners is the 'prime vehicle for transmitting ideas, concepts, and other information necessary for ensuring effective work performance' (Allen 1977: 269). Allen crystallizes this idea around the concept of the 'nonterritorial office':

> 'Under this concept, not only are all office walls removed, but most desks and other permanent stations are eliminated as well. There remains but one permanent station, occupied by a "central communicator" who handles incoming and outgoing mails, assists visitors, and operates a switchboard directing calls to the telephone nearest the recipient of a call. All work is performed at laboratory benches and large round tables, and an individual may choose to work anywhere that suits him in the area or that is convenient.' (1977: 270)

Lars Spruybroek and NOX Architects (Amsterdam) designed the V2 Lab. First, they mapped desired movements in the building, looking for existing repetition in movement. Then they mapped 'all that is in tension, all possible movement' (Spruybroek 2000: 171). Rather than keeping events apart, they connected them in different (virtual) ways. In their diagrams, points become the intersection of lines (knots) and lines took on the form of waves and created zones of transformation and intensification (plateaus). Spruybroek used the example of merging floor and office space to create opportunities for people to lie down between table and corridor, drink their tea in the afternoon, or walk up and down while speaking with a colleague. Thus, following Hillier (1996: 54), we see such architecture as 'taking into reflective thought ... the non-discursive, or configurational, aspects of space and forms in buildings'.

Words, such as the noble statements of the SAS CEO, might shape a building, but the building does not necessarily shape human behaviour. Hence, the idea that it is open space that enhances social relations may be a preconception of office interior designers (see Hatch 1990), rather than a social fact: the reality may be more contingent, as the descriptions of open-plan offices in innovative Japanese organizations suggest (Kono and Clegg 2001).

The discourses of architecture and urbanism, as with organization studies, have been heavily influenced by what, for lack of a better term, has been called 'post-modernism' (Jencks 1991).[2] Architects and urbanists deal with concepts derived from management and organization theory: they reflect on the spatial *organization* of buildings; they analyse the *organizational depth* of a building; they speak of urban *change management*; they are concerned with urban *planning*; they develop *strategies* for regional development, to name but a few issues on their agenda.[3] Doubtless, a management and organization theory more open to these architectural issues could inform them and engage in a fruitful dialogue.

In terms of Kant's aesthetics, architecture was the lowest and least beautiful of the *beaux arts* because it was the most constrained and tied to money, interests, and ground. It resisted the pure and free construction of other arts — which is exactly why we are fascinated by it. With Deleuze and Guattari we would make 'architecture ... the first of the arts' (Deleuze and Guattari 1999: 186; Rajchman 1997) because it deals with materiality — with those long-neglected, seemingly mere supplementary things that only support the intellect as a strategic realm. Architecture orders and manages human activities; it distributes bodies in a certain space and organizes the flow of communications. Thus, it has a great deal to do with power (Markus 1993; Hirst 1995) and obligatory passage points (Clegg 1989), and instead of simply being an ordering means that it engages in a 'politics of complexity' (Girard 1995).

To reduce the question of space to a mere problem of what it contains is, as Lefebvre (1991: 94) suggests, more than a simple error, because space is a 'social morphology' (Munro 2001a). For instance, Walter Gropius (1935: 24), one of the leading figures of the Bauhaus School, dreamt of architecture as a remastering of space that would succeed through standardization,[4] using positivist terms that had defined the enterprise since the late-19th-century recoil from what were seen as the unsanitary and unhealthy disasters of industrialization. Standardization was conceptualized as 'the criterion of a polite and well-ordered society' (Gropius 1935: 37), in which the aim was 'realizing standards of excellence, not creating transient novelties' (Gropius 1935: 54). Beyond everything 'loomed the rational form for the whole city as a planned organism' (Gropius 1935: 98), driven by the wish to eradicate the 'evils which produce the chaotic disorganization of our towns' (Gropius 1935: 110). Le Corbusier also shared Gropius's enthusiasm for standardization:

> 'A standard is necessary for order in human effort. A standard is established on sure bases, not capriciously but with the surety of something intentional and a logic controlled by analysis and experiment. All men have the same organism, the same functions. All men have the same needs.' (Le Corbusier 1923: 110)

Both Le Corbusier and Gropius had similar views about the powers of planning. 'Without a plan, you have a lack of order, and wilfulness' (Le Corbusier 1923: 2). The plan is the 'key of evolution' (Le Corbusier 1923: 64), 'that by which the whole [is] irrevocably fixed' (Le Corbusier 1923: 17), and 'what determines everything; it is the decisive moment' (Le Corbusier 1923: 48). A 'plan proceeds *from within to without*, for a house or a palace is an organism comparable to a living being' (Le Corbusier 1923: 180). The building itself becomes a planned machine, such that a 'house is a machine for living in' (Le Corbusier 1923: 4) and an 'armchair is a machine for sitting in and so on' (Le Corbusier 1923: 95, see also 240). Le Corbusier was driven by a yearning for order: 'As we move higher in the scale of creation, so we move towards a more perfect order' (1923: 23). But this order seems constantly to be in danger of vanishing into space. The modernists leave no doubt as to the source of this order: the architect as 'creator of organisms' (Le Corbusier 1923: 103).

Le Corbusier reflected on the potentialities and dangers of architecture 'as a question of building which is at the root of the social unrest of to-day ... The balance of society comes down to a question of building. We conclude with these justifiable remarks: *Architecture or Revolution*?' (1923: 8, 265). Le Corbusier (1923: 48) saw architecture as a 'profound projection of harmony'. The function of Le Corbusier's mass housing projects was control, just as much as Baron Haussmann's boulevards in Paris. Peer surveillance and the difficulties of organizing rebellion in a city in the sky would replace the necessity for the cavalry charge and the volley of gunfire.

The similarities of architectural designs with organizational designs (in being based on an imperative of control: Clegg and Dunkerley 1980) are striking, but not surprising, because what we see in each is the working out of a common Cartesian heritage. To picture space as a 'frame' or container with no other purpose than to preserve what has been put in it is an error displaying traces of Cartesian philosophy (Descartes 1954). In both disciplines, in architecture and organizations, planning a controllable and predictable development is the driving force. As Hadid states concerning architecture: 'The plan is the architectural vehicle for the manipulating of the ground, its multiplying, renewing, intensifying and re-naming' (2000: 211).[5] In functionalism, the planning mind imposes order: architects such as Le Corbusier share with orthodox management thinking a fascination with machine metaphors, standardization, and control (Morgan 1986).

Form Does Not Follow Function

Functionally, strategies are developed, implemented, and justified by their usefulness. However, one cannot know in advance whether future demands will differ from today's insights: the category of 'usefulness' is a fatal attraction because it is easier to do what is known than what is not. 'Indeed, we have not any organ at all for *knowing*, or for "truth": we "know" (or believe, or fancy) just as much as may be *of use* in the interest of the human

herd, the species; and even what is here called "usefulness" is ultimately only a belief, a fancy, and perhaps *the most fatal stupidity by which we shall one day be ruined*' (Nietzsche 1974: 301, emphasis added). Weick (1979) puts it more bluntly as 'Stamp out utility!' In fact, what might seem useful today can become the obstacle to tomorrow's success.

It is not strategy that determines structure; rather, new functions evolve from forms. 'Against Darwinism, the utility of an organ does not explain its origin! For most of the time during which a property is forming it is of little use, least of all in the struggle with external circumstances and enemies,' as Nietzsche (1968: 343) argued. Think, for instance, of birds: that wings enable them to fly is true and no doubt wings are functional if flying is desired. But during the development of wings it was the other way round: light, unstable bones, that could easily be broken, would be just one of the many disadvantages of these strange protuberances before the bird was actually able to take off. In evolutionary terms, the capacity to fly emerged out of a whole range of formal settings that first made it possible. In fact, function (flying) followed form. Speaking generally, new competences and new functions emerge after (at best, during the process when) the organ is assembled with other elements. Deleuze and Guattari suggest there 'is no preformed logical order to becomings and multiplicities' (1987: 251). There is no pre-given plan. Thus, we can conclude that we should not look for solutions within a pre-given frame, but concentrate on forms and new spatial arrangements from where new functions emerge.[6]

Architecturally, functionalism finds its terminus in the bunker: if strategy determines structure and form follows function, we end up in what Pawley (1998) has called 'terminal architecture'. It reflects the total domination of space through martial strategies. Consider the conception of space emergent in the USA after 11 September: a paranoid space threatened by invisible forces, and the more invisible and undetectable, the more dangerous and present they are assumed to be. Pawley wrote prophetically that 'The architecture of terror comes from the universally acknowledged need to protect the highly serviced and vulnerable built environment of the modern world from attacks that fall short of declared war' (1998: 148). An architecture driven by the need for security and safety leads to 'security architecture' and 'exclusion zones'. The security adviser becomes the lead consultant instead of the architect. Bunkers thrive instead of architecture.

Terminal space is driven by rules of security and obsessed by the idea of a 'defensible space' (Newman 1972), which seeks to make the target inconspicuous or impregnable, so any uniqueness of appearance in a building will immediately be ruled out. Decorative landscape elements, such as trees around the building, will be removed because they might obstruct surveillance cameras. All recesses, undercrofts, and stairs will be minimized in the design because they might provide hiding places for bombs. Stairways, corridors, and light will be subordinated to the logic of the surveillance camera (Foucault 1998: 36). To make such a place is to make a domain that 'Like prisons ... will certainly help people know where they are and, by extension, who they are. But they may not like what they find' (Pawley 1998: 154).

Function Follows Form

Architecture structures the spaces in which we live and through which we relate to each other (Hillier and Hanson 1984: ix). Just as society can be respatialized in its organization, so space can be resocialized. As Hillier and Hanson state, the chief obstacle to better design is the 'lack of understanding of the precise nature of the relation between spatial organization and social life' (1984: x). We aim to explore this relation, instead of subordinating one element to the other, as usually happens in sociological models that see space as a function of the form of social solidarity (mechanic and organic solidarity (Durkheim 1964) and *Gemeinschaft* and *Gesellschaft* (Tönnies 1963)).[7] On the contrary, perhaps space is the precondition for the possibility of these forms of solidarity to emerge? Is not social organization a product, a function of the space it inhabits? Do not functions evolve from spatial forms? Does not structure first give birth to strategies? These are, essentially, political questions — questions that architecture has explored. From the 1970s, architectural discourse increasingly reflected its political dimension, questioning dominant architectural thinking and planning (for example, Goodman 1971; Sennett 1970; Pawley 1971).[8] A critique was launched of so-called post-modern architectural theory, understood as focusing on aesthetics instead of politics, and thus as 'devoid of political content for the people affected, the more elite and the more removed from the political review of ordinary people become the experts who use this currency' (Goodman 1971: 113). Joining neither the aesthetic nor the critical camp,[9] we argue, with Foucault (1980: 244), that architecture is always ambiguous: it can neither ensure nor hinder freedom; liberty is a practice, and architecture has to think about its effects on these practices.

Foucault saw panoptical space as a construct that created a specific type of person: a worker under supervision who has inculcated an ethos of being seen to be at work. The person does this as a result of the ever-present possibility of surveillance, creating subjects who discipline themselves. Disciplinary power was analysed by Foucault (1995) first and foremost in spatial terms: discipline 'proceeds from the distribution of individuals in space ... Each individual has his own place; and each place its individual.' What it avoids are 'distributions in groups' and the 'break up' of 'collective dispositions'. What it seeks are analyses of 'confused, massive or transient pluralities'. Thus, disciplinary space 'tends to be divided into as many sections as there are bodies or elements to be distributed. One must eliminate the effects of imprecise distributions, the uncontrolled disappearance of individuals, their diffuse circulation, their unusable and dangerous coagulation ... Discipline organizes an analytical space' (Foucault 1995: 141, 143). The panopticon was an architectural apparatus that organized space in such a way that power was created and sustained. Bentham stated its evident benefits as 'Morals reformed — health preserved — industry invigorated — instruction diffused — public burthens lightened — Economy seated, as it were, upon a rock — the Gordian knot of the Poor-Laws not cut, but untied — all by a simple idea in architecture!' (quoted in Foucault 1995: 207).

The idea of the panopticon demonstrates that power and architecture are inseparably intermingled. 'The panoptic mechanism is not simply a hinge, a point of exchange between a mechanism of power and a function; it is a way of making a power relation function in a function, and of making a function function through these power relations' (Foucault 1995: 206; see Ingraham 1998: 134). The exercise of power is not added from the outside, it works from the inside, it is inscribed into the heart of the spatial organization: in fact, architecture is power.

Architecture is a powerful means of directing and redirecting our attention, feelings, and thoughts to certain points through the organization of spatial structures — shopping centres are, of course, an excellent example of this organization (Abaza 2001). First, there is the form, properly designed; then we fill it with functions, appropriately conceptualized, but often imperfectly realized. Shopping centres become urban wastelands and harmony gives way to social conflicts concerning how the spaces created are colonized: skateboards versus motor cars, youths versus the authorities, blacks versus whites, and big landlords against small tenants. Resistance is normal.

Architecture can create new competences — and these do not have to be under the control of a supervisory other (Gomart and Hennion 1999: 221; Fox 2000; Lee and Brown 1994). Its discipline may be productive, revealing, and multiplying as well as interiorizing. Markus (1993) argues that the power of space can materialize itself in three different types of buildings: buildings that shape people (such as schools or prisons), buildings that produce knowledge (such as libraries and museums), and buildings that produce and exchange things (such as workshops and markets). In organizations, these three types intermingle and their boundaries blur. Power through buildings is exercised through the way people are defined as different kinds of members and strangers; in the way that they meet; through the control of the interface between inhabitants and visitors; through the location of persons and things; and through control of their paths of movement and visual, acoustic, and communicative paths (Markus 1993: 96).

Space, Power, and Management: The Generative Building

Tapping the tacit knowledge of individuals is a key aim of knowledge management. Using Foucault, Hillier's notion of the generative building (1996) and drawing on the discussion delineated above, how can we design productive networks and how may space be opened up to positive power, rather than closed down for negative control? The ambiguous productivity of power requires examination in relation to space. Foucault (1995: 172) once said 'Stones can make people docile and knowable'; we wonder if stones and other materials can make us creative and passionate as well.

When one designs a building, potential problems necessarily arise: people between whom there seems to be no current, rational reason for communication will be separated, while people who are thought to share a common understanding will be located within an interactive space. There may even be

steps taken to minimize the intrusion of apparently unrelated groups and to minimize the need for movement on the part of staff by making sure that all facilities required for work are conveniently located. These, and many other efforts, would be 'reasonable steps to take in order to produce a rational and efficient building plan' (Hillier 1996: 270). Such an efficient building would increase certain, pre-formulated areas of knowledge by controlling for randomness, but the boundaries of this knowledge will seldom be challenged or broken. In contrast, losing control a little requires cross-boundary and sometimes boundary-blurring communication, and in this sense, it seems that the spatial organization of a building is actively involved in the creation of new power-knowledge relations.

Creative architecture must balance 'predictability and randomness'. Completely ordered or completely chaotic systems have difficulty evolving, improving, or progressing. 'By contrast, a system pushed far-from-equilibrium to the boundary between order and chaos — to that crucial phase transition — is rich in possibilities" (Jencks 1997: 85). For Jencks (1997: 168), architecture happens at the edge of chaos because a 'too-simple order is boring, and overly-connected building is too complicated, so one looks for an upper mean of connections. The conjunction is not "New Age" — "connect, always connect everything" — nor traditional — "order out of chaos"; but rather "higher organization out of order *and* chaos"' (see also Serres 1982). Such a conception of a building exists as a point of reference — a theory of order defined not only by the uses it enables, but also the organization that occurs in it, as well as by the material form it presents and represents (Tschumi 1995: 82).

Hillier investigated the creativity of two research labs that differed in terms of their spatial structure and effects: 'weak ties generated by buildings may be critical because they tend to be with people that one does not know one needs to talk to. They are, then, more likely to break the boundaries of the existing state of knowledge represented by individual research projects, organizational subdivisions, and localism' (1996: 264). The creation of positive power requires randomness that can be actively encouraged by architectural design. The major task becomes '[h]ow to combine the protection of the solitary with the natural generation of more randomised co-presence with others — the need for which seems to grow the more the objectives of research are unknown' (Hillier 1996: 265). The architectural output of such a complex combination is what Hillier (1996) calls a 'generative building'.

A generative building combines order and chaos; it embodies (dis)organization (Cooper 1990); creative problem solving requires a 'spread-out place' where two or more people can talk about their experiences and newly occurring problems. In fact, organizations need chaotic, ambiguous, and incomplete space. As Horgen et al. (1999: 197) observe, 'The ambiguous, incomplete work environment seemed to lend itself to tasks of collaborative inquiry in which problems were unclear and needed to be framed and where data were being explored whose meanings were as yet unclear.' Ambiguous space can be created in between differentiated organizational subsystems, so

that, for instance, neighbourhoods of different disciplines can be grouped together for the duration of a project. There must be margins, where people who are normally separated exchange ideas and concepts. Moreover, it is exactly at these margins where creative organizing and positive power happens:

> 'Organizing practices develop in this boundary area, the margin created by the will and vision of a recurrent and predictable world on the one hand, and on the other the reality of a molten universe that is always on the verge of fusing its elements.' (Kallinikos 1996: 23)

Generative buildings must create margins where things are loosely coupled so that they can act, react, and interact flexibly: 'Flexibility is not the exhaustive anticipation of all possible changes. Most changes are unpredictable ... Flexibility is the creation of margin — excess capacity that enables different and even opposite interpretations and uses ... New architecture, lacking this kind of excess, is doomed to a permanent state of alteration, if it is to adjust even minor ideological or practical changes' (Koolhaas 1995: 240). A generative building will be a space where problems *can* occur. It will not be driven by the functionalist belief that form follows function. Rather, it explores the potential of alternative forms that give rise to new problems and questions. Modernist architecture might focus on how problems can be solved, but it does not determine which problems it attempts to solve (Venturi 1966: 17). Reduced to a formula, in modern architecture form follows function; in the architecture of complexity, this image is reversed, as form evokes function (Venturi 1966: 34).

The slogan 'less is more' applies aptly to an architecture of complexity which does not attempt to occupy an entire space, does not determine rooms for functions. Instead, it implies that space has to contain possibilities, which might be perceived as emptiness. Following Koolhaas (1995) we could term this the 'strategy of the void': 'Imagine a building consisting of regular and irregular spaces, *where the most important parts of the building consist of an absence of building*' (1995: 603). Such spaces are capable of transforming themselves while being (ab)used and occupied by different people only temporarily.[10]

A generative building reflects movements, not static conditions. 'The most basic types in architecture are precisely those whose formal features imply basic kinds of human movement' (Franck and Lepori 2000: 37).[11] Architecture is the choreography of movements. For example, are stairs (see Franck and Lepori 2000: 38–39) made to move from A to B, or do they contain places which invite us to stop and pause for a minute? Do floors connect between rooms or are they places where things can happen? Often, in hospitals, where time is tight, space scarce, and emergencies common, corridors become scenes for resuscitation and drama. Similarly, in universities, open spaces become colonized as spaces for conviviality and work, romance and play, between the use of official spaces such as lecture theatres. Are toilets purely functional, dividing and reinforcing the division between female and male? Could they be places where intermingling, flirting, and communication occur? Take, for instance, the Sobber-Club in Amsterdam,

where the toilets do not differentiate between female and male, but between sexualities. One may suppose that such a spatial division means that things might happen there which normally would not. These examples touch on a fundamental question regarding how we organize space and how we are organized by space. How do we reterritorialize ourselves in crowded spaces, for example, in trains, on dance floors, or in a cell, a flat, a lift, or a queue?

Generative movement in structures leads to a concept of 'liquid' architecture. Liquid architecture seeks not to impose a hierarchy, but to compose creative forces that flow, stream, and move in space (see Mol and Law 1994), that is, 'not fixed but changing and multiple, capable of bringing together on the same plane diverse experiences that are in no sense either exclusive or hierarchical' (Sola-Morales 1998: 40). Kahn, for instance, presented a 1953 plan for the centre of Philadelphia in which 'buildings were merely the edges around which flowed cars, public transportation, and pedestrian traffic. The structure of the urban space was seen as a result of systems of frictions of varying degrees of viscosity, producing turbulences at the points of contact and different densities within the flows themselves' (Sola-Morales 1998: 43).

Constantly shifting problems require a flexible design, one that enables and encourages communication beyond existing organizational boundaries. The usual interfaces of employee–screen, teacher–pupil, speaker–audience, and observer–observed will be organized differently. The interaction between different spaces and fields is not merely expressed, but actively created through forms and materials: through glass, steel, bricks, earth, light, windows, furniture, details, colours, and quasi-objects that attract us. Take the example of light; light tells people how to move, how to speak, and how much intimacy is invited (candle light, strobe lights in a club, and brilliant sun on a beautiful beach with beautiful people).

Of course, what is generative in one context may be a disaster in another (Hall 1959). Think of religious design, for instance. The interior of a cathedral, mosque, synagogue, and Hindu temple are very different spaces because they serve very different assumptions about the nature of worship and religious conviviality, the appropriate rituals, and the mingling of the sexes. Hence, there can be no non-contextual plan for a generative building: what may work for the servants of Allah may not work for those of Shiva or God. The meaning of space varies with context (Flyvbjerg 2001), just as much as the meaning of worship or colour (Doxater 1990).

Conclusion

To sum up, we have argued for a production of space that informs the space of production, for organizing the generative building. The generative building distinguishes itself from a terminal building in five respects: (dis)order, flexibility, problem generation, movement, and design. The architectural design of a generative building offers a way out of power premised on control into more positive power, away from the panic rooms of terminal architecture towards the design of spaces where surprising things may happen.

Instead of sharing Cartesian assumptions, we made problematic organizational materiality and its concrete spatial arrangement as a driving force behind every process of organizational change and transformation. While thinking within a temporal horizon is inextricably linked to a linear unfolding of events in time, spatial thinking allows ambiguity and contradictions. Managing space creatively necessitates a generative building. The focus on space and its influences is a powerful way of creating sustainable development, as is evident in the burgeoning fields of space consulting and interior design. A generative building invites its inhabitants to become 'illegal architects' (Hill 1998), (ab)using and (re)defining space according to the context and situation. Illegal architects utilize established power and its architectural manifestations, opening up closed spaces and temporarily closing open spaces, and hijacking designs — a process which Goodman (1971) calls 'guerrilla architecture'. Generative buildings are what Rudofsky (1964) has called 'architecture without architects', a 'nonpedigreed architecture', planned anonymously, emerging spontaneously, changing unpredictably, shaped by the creativity of the users and developed just-in-time (De Certeau 1984).

As Hillier (1996) says, space is the machine that provides a setting, a concrete spatial arrangement wherein organizationally positive power emerges. As the basic precondition of organizational learning and becoming, it provides the stage on which people can interact freely and enact their ideas creatively. A generative building organizes the flows of communication, knowledge, and movement. At their intersection, where they coincide and intermingle, surprises emerge that cannot be intentionally produced and controlled.

Notes

1 Markus and Cameron explore this dilemma using the example of the newly built Scottish parliament: on the one hand, it should embody an 'architecture of democracy' (Markus and Cameron 2002: 75), triggering openness, transparency, and accessibility; on the other hand, and undercutting the democratic aspiration, there is a strong concern with security, control, and surveillance.

2 For the 'postmodern turn' in architecture, see the special issue of *Architectural Design* (1988) about deconstruction or the special issue about the fold in *Architectural Design* (1993). See also Wigley (1993), Kipins and Leeser (1997), Cache (1995), Kwinter (2001), and Hirst (1995). For translations into buildings, see the work of Eisenman, Tschumi, or Lynn, to name but a few.

3 See, for instance, Van den Berg et al. (1999: 114), who state that the 'prosperity and continued success of a metropolitan region depend to a high degree on its organising capacity'. As they argue, there is a need for organizing capacity that is the 'essential factor for sustainable development' (Van den Berg et al. 1999: 115).

4 The Aston School, working from a basement they shared in a decaying part of Birmingham, had a similar dream about the standardization of organizational space.

5 There are, of course, competing and somewhat more participative and less arrogant views: some see planning and designing as processes that involve many voices and many languages, and the plan as the product of a polyphonic practice. For instance, Lucien Kroll's Medical Faculty Buildings at the University of Louvain (1967–74), where: 'The students, who were divided into flexible teams, participated in designing the buildings along with Kroll, who acted rather like an orchestra leader. They shifted small bits of plastic foam around in working out the overall model. When disputes arose, or one group became too dogmatic and fixed, Kroll reorganized the teams so that each one became familiar with each other's problems, until a possible solution was in sight. Not until then did he draw up the plans and sections, which made it workable. The resultant buildings

show a complexity and richness of meaning, a delicate pluralism, that usually takes years to achieve and is the result of many inhabitants making small adjustments over time' (Jencks 1991: 86).

6 Plans hinder the development of new, surprising, emergent events — think of planned capital cities, such as Canberra, which, while supremely abstract, rational, and 'practical', are largely restricted in their capacity for organic growth and for surprise (Grosz 2001: 137). In a word, they are boring. It is interesting that both Brazilians and Australians refer to their remote, planned capital cities as 'Fantasy Island'.

7 Even Hillier and Hanson (1984: 142) follow in their profound analysis the following causality: society determines space, or in their terms, spatial organization is a function of the form of social solidarity.

8 As, for instance, Goodman wrote dramatically, architects are 'more sophisticated, more educated, more socially conscious than the generals (of military and police) — we're the soft cops. Planners want "social change"; they deal in words, drawings, programs and buildings, not guns and napalm. But the kind of "social change" they find themselves dealing with, whether or not they recognize it, is organizing the oppressed into a system incapable of providing them with a human existence, pacifying them with the meagre welfare offerings that help maintain the status quo' (1971: 13). Contemporary analyses of power and architecture may be found in Hirst (1995), Pearson and Richards (1994), and Markus (1993).

9 See, for instance, Koolhaas' (1995: 226) critical statement about critical and liberating architecture: 'Were not division, enclosure (i.e., imprisonment), and exclusion — which defined the (Berlin) wall's performance and explained its efficiency — the essential stratagems of *any* architecture? In comparison, the sixties dream of architecture's liberating potential — in which I had been marinating for years as a student — seemed feeble rhetorical play. It evaporated on the spot.'

10 See, for instance, the concept of free-space (Woods 1992, 2000) and minimal architecture (*Architectural Design* 1994). Concrete examples may be architects such as Claudio Silvestrin, Alberto Campo Baeza, or Rem Koolhaas, who create unoccupied, empty spaces.

11 As a visitor at Xerox stated: 'You'd be having a conversation and somebody would come up from behind and enter the conversation. And he would stay for five minutes, and then he drifted off into a lab or someplace else ... People just floated in and out' (Horgen et al. 1999: 212).

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